

Chapter 35

Evolutionary Aside 35.1--Evolutionary Diversification of the Amphibians: paraphyly of the Amphibia, but monophyly of the clade of living amphibians

As discussed in Section 35.6, amphibians experienced a great evolutionary radiation during the Age of Amphibians, producing a huge variety of ecologically and morphologically distinct species. Among these ancient amphibians, one gave rise to the amphibian clades extant today, the Anura (frogs), Caudata (salamanders) and Apoda (caecilians). Although there is some disagreement among scientists, most consider extant amphibians (and a few, closely related fossils) to be monophyletic, forming the clade Lissamphibia.

Another species present in the Age of Amphibians evolved to become a reptile, and thus served as the ancestor to the clade containing all amniotes (that is, reptiles, birds, and mammals). As a result, the class Amphibia is paraphyletic because some extinct amphibians are more closely related to reptiles, birds, and mammals than they are to other amphibians. However, all such amphibian species are now extinct, leaving as the only surviving amphibians the clade Lissamphibia, in which all species are more closely related to other extant amphibians than they are to nonamphibians. This explains the seeming paradox that the Amphibia (including fossil representatives) is paraphyletic, yet when one builds a phylogeny based on extant species (as in figure 23.5), modern amphibians are portrayed as monophyletic.